

Nuclear Science Division

Integrated Safety Management (ISM) Plan, PY2007

Introduction

The Nuclear Science Division (NSD) performs basic research in the areas of relativistic heavy-ion physics, nuclear physics, nuclear theory, nuclear astrophysics, nuclear chemistry, nuclear data evaluation and detector development. The Integrated Safety Management (ISM) Plan describes the Division program and commitment to integrating safety awareness into all levels of the Division's activities. NSD is committed to performing its work safely and in a manner that ensures adequate protection for employees, guests, the general public, Lab assets, and the environment.

ISM Implementation

The NSD ISM Plan incorporates the seven guiding principles and five core functions of ISM for improving safety in the workplace. (See Appendix A)

The ISM Plan establishes a management strategy to ensure that all work is carried out in a safe manner consistent with appropriate institutional and divisional EH&S policies and procedures. The plan covers all Nuclear Science Division employees and guests, including students, regardless of work location. Work at the U.C. campus will conform to the LBL-UC Partnership agreement.

The Division plan is discussed annually at a mandatory All-Hands meeting on ES&H and can be read on the Division Web site. Changes in policy, lessons learned and other information are transmitted by e-mail, at all-staff, building-wide, and project/group meetings, and by members of the ES&H Committees.

Responsibility and Accountability

The Division Director is responsible for assuring that all NSD activities are carried out in a safe manner, in accordance with applicable Laboratory requirements. The ES&H Coordinator oversees the Division ES&H program and is responsible for its effectiveness and audit.

Program Heads are responsible for establishing and maintaining appropriate oversight of ES&H procedures and activities.

Group/Project Leaders are responsible for ensuring that work performed by members of the group is conducted in a safe manner, in accordance with appropriate Division and Laboratory procedures and requirements and for ensuring correction of deficiencies on a timely basis. Each individual group member has this same responsibility.

Supervisors are responsible for ensuring that Division employees and guests have appropriate training and regular oversight (see training).

Shared responsibility exists for employees matrixed from other divisions and may be spelled out in agreements with those divisions. Matrixed employees participate in NSD activities, such as emergency teams, self-assessment teams and ES&H Committees and are integrated into facility operations.

All Nuclear Science Division staff and guests are responsible for stopping work activities that are considered to be an imminent danger.

ES&H Committees

The NSD Safety Committee consists of a Chair, the Division's ES&H Coordinator, and program representatives or group leaders, including a representative from the 88-Inch Cyclotron Safety Committee. The Committee meets four times per year. The committee reviews new projects to insure that all required procedures are followed and Lab requirements met before work begins. The Committee also reviews accidents and occurrences to determine root causes and trends and recommends procedures and policies to the Division Director.

The 88-Inch Cyclotron Safety Committee meets four times per year. The Committee consists of representatives from Cyclotron operations staff and research groups, the Division's ES&H Coordinator and the Cyclotron's Radiological Technician (see below). The Committee reviews projects and addresses ES&H issues pertinent to the safe operation of the Cyclotron.

The Division's EH&S Liaison is invited to the meetings of the NSD Safety Committee and the 88-Inch Cyclotron Safety Committee.

The Committees participate in Self-Assessment activities and can propose corrective actions.

Scope of Work

The principal objective of the Nuclear Science Division is the experimental and theoretical investigation of nuclear physics and chemistry, with a focus on understanding nuclei and nuclear matter under extreme conditions. The Division operates the 88-Inch Cyclotron for basic and applied research. In addition to the basic research program at the 88-Inch Cyclotron, work-for-others is also performed. Members of the Division participate in off-site experiments, e.g., RHIC, CERN, SNO, etc.

Work Authorization and controls

Project/group leaders are responsible for the control of chemical, radiological and bio hazards in their laboratory. They will ensure that appropriate hazard databases and authorizations are updated during laboratory relocations. Line management will ensure that proper knowledge and control of all hazards is transferred in a timely manner during a change in staff or departure of staff.

Line management is responsible for terminating or suspending operations when appropriate approvals are lacking, have expired or training is not current

Major projects undergo a formal Operational Readiness Review (ORR) or Accelerator Readiness Review (ARR) under DOE direction. Smaller projects undergo internal readiness reviews and work authorization processes performed by program and Division management as described below.

The 88-Inch Cyclotron Facility Safety Analysis Document (SAD) describes an analysis of hazards and the control measures and procedures (engineering and administrative) implemented to ensure safe operation.

Cyclotron experiments are reviewed by the Cyclotron staff. Experiments that require new or modified setups or changes to the facility are referred to the Technical Safety Subcommittee (TSS) of the Cyclotron's ES&H Committee. The TSS reviews the experiments in both the design stage and before implementation. Other changes to the facility, such as the reconfiguration of shielding, are also reviewed by the TSS.

For other projects, the Hazard, Equipment, Authorizations Review (HEAR) form or the Project Safety Review Questionnaire is prepared for new or modified experiments and reviewed annually. Based on information contained in these forms, the project can be approved or further

documentation or authorization required. Authorizations such as Activity Hazard Documents are prepared by the project leader, reviewed by the ES&H Committee and then forwarded to EH&S Division. These authorizations are reviewed annually.

Work requiring a Radiation Work Authorization (RWA) or Sealed Source Authorization (SSA) will be performed in accordance with the authorization issued by the EH&S Division. EH&S Division reviews these annually.

A description of work activities requiring formal authorizations (e.g. AHDs and RWAs, SSAs) is given in Chapter 6 of PUB 3000. Examples of NSD activities requiring formal authorizations are given in Appendix B of this ISM, together with a list of current AHDs and radiological work authorizations

Oversight and site-specific safety training for off-site experiments is conducted by the host institutions. However, for work at non-DOE sites, a HEAR form or Project Safety Review Questionnaire will be completed and reviewed by the ES&H Committee. Large off-site experiments often have significant documentation in ES&H and QA.

Qualification and Training

NSD selects and assigns personnel in accordance with the RPM and HR procedures. Staff and guests are selected based on their knowledge, skills and experience.

Supervisors are responsible for ensuring that assigned employees/guests whose anticipated assignment with NSD exceeds 90 days complete a Job Hazards Questionnaire (JHQ). JHQs are updated when work scope changes and both JHQs and training status are reviewed annually during the P2R process. Users of the 88" Cyclotron complete a facility-specific Questionnaire.

Supervisors are responsible for reviewing employee and guest training requirements and ensuring all required training is completed in a timely manner

Performance Metrics

The effectiveness of the plan will be assessed against a set of performance metrics as part of the annual Self-Assessment (SA) process. The ES&H Committee will review data from Division and Laboratory inspections, walkthroughs, reviews, SA, IFA, MESH to track and trend where appropriate and will, where appropriate, identify corrective actions. Some areas to address in detail: accident and injury rates; exposures, environmental releases and all occurrence reports.

Resources

ES&H costs are integrated into project expenses.

To facilitate implementation of the ISM Plan, the following Division resources are made available:

0.25 FTE Division EH&S Coordinator

0.33 FTE Administrative Assistant

0.20 Safety Committee Chair

The following resources are made available by the EH&S Division for the Cyclotron program:

1.00 FTE Radiological Control Technician

0.10 FTE Health Physicist and

0.20 FTE Field Support Department Division Liaison

NSD also receives support from EH&S Division professionals as-needed for specific expertise: hazard evaluation, waste management, industrial hygiene consultation occurrence reporting and, participation in Division and Laboratory self-assessment activities

Summary

The goal of NSD is to perform world class research in a manner that protects the health and safety of our employees and visitors. Although NSD has a good safety record, it is the goal of the Division to continue to improve its safety performance. This ISM Management Plan is an attempt to integrate safety awareness into all levels of the Division's activities. This Plan will be reviewed annually and updated as needed to facilitate compliance with regulatory requirements and to enhance the effectiveness of the Plan.

Nuclear Science Division Safety Committees

Division Safety Committee

Dennis Collins, 88-safety committee chair

Paul Fallon, Deputy Division Director, ES&H Coordinator (acting)

Brian Fujikawa, INPA, neutrino program

Daniela Leitner, Cyclotron Operations

Larry Phair, Low Energy (Chair)

Jorgen Randrup, Theory

Frank Rosado (Secretary)

James Thomas, RNC

Linnea Wahl, EH&S Division Liaison

88-Inch Cyclotron Safety Committee

Jeff Bramble, Radiological Control Technician

Dennis Collins, Cyclotron Deputy (Chair)

Rod Clark, Nuclear Structure Group

Ken Gregorich, Heavy Element Group

Paul Fallon, Deputy Division Director, EH&S Coordinator (acting)

Frank Rosado (Secretary)

Claude Lyneis, Program Head

Peggy McMahan, Research Coordinator

Jim Morel, Operators' Supervisor

Larry Phair, Nuclear Reactions Group, NSD safety committee

Jim Rice, Emergency Team Leader

Paul Vetter, Weak Interactions Group

Appendix A

Seven Guiding EH&S Principles:

- Line management responsibility
- Clear and unambiguous lines of authority are identified and maintained
- Competence commensurate with responsibilities is attained by personnel
- Balanced priorities are used to allot resources for research and safety needs.
- Hazards and standards are identified before any hazardous work is performed.
- Controls (administrative/engineering) are in place to prevent and mitigate hazards.
- Operational authorizations are acquired before hazardous work is begun.

Five Core EH&S Functions:

- Define and Plan the Work
- Hazard and Risk Analysis environment
- Establishment of Controls
- Work Performance
- Analysis and Feedback

More details can be found by reviewing the Laboratory “Integrated Environment, Health and Safety Management Plan” at <http://www.lbl.gov/ehs/ism/Title.html>

Appendix B

1) Examples of NSD activities requiring formal authorizations

- work or storage of sealed/unsealed radioactive materials
- class 3b or 4 laser operations
- work with reactive, pyrophoric, or toxic chemicals
- compressed gas use
- cryogenic use
- high pressure or vacuum components

2) Current List of Active Nuclear Science Division Activity Hazard Documents

AHD Number	AHD Name	PI Name
128	Advanced Electron Cyclotron Resonance (AECR), Bldg. 88	Lyneis, Claude M
152	Electron Cyclotron Resonance Ion Source	Lyneis, Claude M
168	Laser use Bldg 70 Room 210	Heino Nitsche
GS1036	Prompt External Radiation Field Operations	Lyneis, Claude M
GS1040	Radioactive Atom Laser Trapping	Vetter, Paul A
GS1041	Oxygen 14 Production and Transportation for Beta Spectrum Measurements	Vetter, Paul A
GS1057	Berkeley Gas Filled Separator	Gregorich, Kenneth E
GS1063	Berkeley Experiments with Accelerated Radioactive Species (BEARS)	Cerny III, Joseph
2068	LBL VENUS (Versatile Electron Cyclotron REsonance Ion Source for Nuclear Science)	Leitner, Daniela
2096	GRETINA	Lee, I-Yang

3) Current List of Nuclear Science Division Radiological Authorizations

Authorization No	Class	Due Date	PI	TITLE
LAS L018		08/2006	Albert Ghiorso	
RWA 1017	II	12/2006	Heino Nitsche	B70 Heavy Element Nuclear and Radiochemistry Group
RWA 1052	I	09/2006	Kenneth E Gregorich	88-Inch Cyclotron Heavy Element Radiochemistry Group
RWA 1054	II	08/2006	Margaret A Norris	Building 88 Waste Characterization
RWA 1079	II	12/2006	Kevin T Lesko	LBNL Low Background Counting Facility (LBF)
RWA 1080	III	10/2006	Joseph Cerny III	Berkeley Experiment with Accelerated Radioactive Species (BEARS) Project
RWA 1103	II	12/2006	Paul A Vetter	Weak Interactions Group
RWA 1104	III	04/2007	Heino Nitsche	Target Preparation
RWA 1115	III	02/2007	Heino Nitsche	Investigations of Inorganic and Bacterial Interactions with Actinides
RWA 1147	II	09/2006	Richard B Firestone	Prompt Gamma Activation Analysis
RWA 1161	I	11/2007	Claude M Lyneis	Production of Uranium rhenium
RWA 5027	III	08/2006	Claude M Lyneis	Cyclotron Proper Vacuum Envelope Maintenance (Deflector and RF tank work)
RWA 5083	III	08/2006	Claude M Lyneis	88-Inch Cyclotron Operation and Maintenance
RWA 5084	III	01/2007	Margaret A Norris	Building 88 Neutron Beam Line Facility
RWP 06-013	II	07/2006	Heino Nitsche	Neptunium Chemistry Glove Box Modification
SSA 181	I	11/2007	Howard S Matis	
SSA 183	II	09/2006	Margaret A Norris	
SSA 208	I	02/2007	Brian K Fujikawa	